

Effectiveness of a Structured Foot-Care Education Programme on Knowledge and Self-Care Practices among Patients with Diabetes Mellitus**Raji Kaliyaperumal¹, Rajakumari²**

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Abstract

Diabetes mellitus is a chronic metabolic disorder associated with an increased risk of foot complications, including ulceration, infection, and lower-extremity amputation. Adequate knowledge and appropriate self-care practices are essential for preventing diabetic foot complications. The present study aimed to assess the effectiveness of a structured foot-care education programme on knowledge and self-care practices among patients with diabetes mellitus in a selected healthcare setting in Coimbatore, Tamil Nadu. A quantitative approach with a quasi-experimental one-group pre-test and post-test design was adopted among 60 patients with diabetes mellitus. Data were collected using a structured knowledge questionnaire and a self-care practice assessment tool. The findings showed that the mean knowledge score increased from 11.20 (SD = 3.10) in the pre-test to 17.80 (SD = 2.40) in the post-test, with a statistically significant difference ($p = 0.001$). Similarly, the mean self-care practice score increased from 9.60 (SD = 2.80) to 15.40 (SD = 2.50), demonstrating a statistically significant improvement ($p = 0.001$). Significant associations were also observed between the duration of diabetes mellitus, previous foot-care education, and baseline knowledge and self-care practice levels. The findings suggest that structured foot-care education may improve knowledge and encourage appropriate preventive foot-care practices among patients with diabetes mellitus. Integrating systematic foot-care education into routine nursing care may help strengthen diabetes self-management and promote the early recognition and prevention of diabetic foot complications.

Keywords: Diabetes mellitus, foot-care education, knowledge, self-care practices, diabetic foot complications, nursing intervention.

Introduction

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycaemia resulting from impaired insulin secretion, insulin action, or both. It is a major global public health concern associated with various microvascular and macrovascular complications that significantly affect the health and quality of life of affected individuals. Among these complications, diabetic foot problems are particularly important because they can lead to foot ulceration, infection, delayed wound healing, lower-extremity amputation, prolonged hospitalization, and increased healthcare expenditure. The prevention of diabetic foot complications requires early

identification of risk factors, regular foot assessment, adequate glycaemic control, and consistent adherence to appropriate foot-care practices.

Diabetic foot complications develop through a combination of peripheral neuropathy, peripheral arterial disease, and increased susceptibility to infection. Peripheral neuropathy may reduce protective sensation, making patients less likely to recognize injuries, burns, pressure-related damage, or minor skin lesions. Peripheral arterial disease can impair blood circulation and delay wound healing, increasing the risk of tissue damage and infection. Inadequate foot hygiene, improper footwear, walking barefoot, inappropriate nail trimming, and delayed reporting of foot abnormalities may further increase the risk of complications. Many of these risk factors can be addressed through regular foot-care practices and timely access to professional healthcare services.

Structured foot-care education is an important component of diabetes self-management and preventive nursing care. It provides patients with the knowledge and practical skills required to inspect their feet daily, maintain foot hygiene, moisturize dry skin appropriately, trim toenails safely, select suitable footwear, avoid walking barefoot, and recognize early warning signs such as redness, swelling, blisters, cracks, discoloration, and non-healing wounds. Education should also emphasize the importance of seeking prompt medical attention when abnormalities are identified rather than attempting self-treatment of potentially serious foot lesions. By improving awareness and encouraging appropriate preventive behaviours, structured education may contribute to the early detection and prevention of diabetic foot complications.

Knowledge and self-care practices are closely related but distinct components of effective diabetes management. Knowledge enables patients to understand the importance of preventive foot care, whereas self-care practices reflect the extent to which this knowledge is translated into routine behaviour. Patients may be aware of the risks associated with diabetes but may not consistently perform recommended foot-care activities because of inadequate instruction, misconceptions, limited access to appropriate footwear, reduced vision or mobility, financial constraints, or insufficient family support. Therefore, providing information alone may not be sufficient. A structured education programme that combines clear explanations, demonstrations, opportunities for clarification, and reinforcement of key messages may help patients develop appropriate and sustainable foot-care practices.

Nurses play a central role in preventing diabetic foot complications through patient assessment, health education, counselling, demonstration of preventive techniques, and reinforcement of recommended self-management behaviours. Individualized education can help nurses identify gaps in patients' knowledge, address misconceptions, and adapt teaching strategies to patients' literacy levels, cultural backgrounds, and functional abilities. Follow-up assessment is also essential to determine whether patients have understood the information and incorporated recommended practices into their daily routines. Evaluating both knowledge and self-care practices provides a broader understanding of the effectiveness of educational interventions.

In Coimbatore, Tamil Nadu, patients with diabetes mellitus require accessible and effective educational interventions to support the prevention of diabetes-related

complications. Assessing the effectiveness of a structured foot-care education programme can provide useful evidence regarding changes in patients' knowledge and reported self-care practices following the intervention. Such evidence may help inform nursing education strategies, strengthen routine diabetes counselling, and support the integration of foot-care education into clinical diabetes management services.

Therefore, the present study aims to assess the effectiveness of a structured foot-care education programme on knowledge and self-care practices among patients with diabetes mellitus in a selected healthcare setting in Coimbatore, Tamil Nadu. By examining knowledge and self-care practices, the study seeks to determine whether structured education can improve patients' understanding and adoption of recommended foot-care behaviours and contribute to the development of evidence-informed nursing interventions for diabetic foot complication prevention.

Statement of the Problem

A study to assess the effectiveness of a structured foot-care education programme on knowledge and self-care practices among patients with diabetes mellitus in a selected healthcare setting in Coimbatore

Objectives of the Study

1. To assess the pre-test level of knowledge regarding foot care among patients with diabetes mellitus in a selected healthcare setting in Coimbatore.
2. To assess the pre-test level of self-care practices regarding foot care among patients with diabetes mellitus.
3. To evaluate the effectiveness of a structured foot-care education programme on knowledge among patients with diabetes mellitus.
4. To evaluate the effectiveness of a structured foot-care education programme on self-care practices among patients with diabetes mellitus.
5. To determine the association between pre-test knowledge levels and selected demographic and clinical variables among patients with diabetes mellitus.
6. To determine the association between pre-test self-care practice levels and selected demographic and clinical variables among patients with diabetes mellitus.

Research Hypotheses

H₁: There will be a statistically significant difference between the pre-test and post-test levels of knowledge regarding foot care among patients with diabetes mellitus following the structured foot-care education programme.

H₂: There will be a statistically significant difference between the pre-test and post-test levels of self-care practices regarding foot care among patients with diabetes mellitus following the structured foot-care education programme.

H₃: There will be a statistically significant association between pre-test knowledge levels and selected demographic and clinical variables among patients with diabetes mellitus.

H₄: There will be a statistically significant association between pre-test self-care practice levels and selected demographic and clinical variables among patients with diabetes mellitus.

Methods

A quantitative research approach will be adopted to evaluate the effectiveness of a structured foot-care education programme on knowledge and self-care practices among patients with diabetes mellitus in a selected healthcare setting in Coimbatore, Tamil Nadu. A quasi-experimental one-group pre-test and post-test research design will be used to assess changes in knowledge and self-care practices following the educational intervention.

The study population will comprise patients diagnosed with diabetes mellitus who attend the selected healthcare setting in Coimbatore. Eligible participants will be selected using a non-probability convenience sampling technique based on predefined inclusion and exclusion criteria. Patients diagnosed with diabetes mellitus who are willing to participate and able to provide informed consent will be included in the study. The sample size will be determined based on the study objectives, feasibility, and appropriate statistical considerations.

Data will be collected using a structured questionnaire to assess demographic and clinical characteristics, a knowledge assessment questionnaire on diabetic foot care, and a structured checklist or practice assessment scale to evaluate foot-care self-care practices. The instruments will cover essential aspects of diabetic foot care, including daily foot inspection, foot hygiene, nail care, footwear selection, prevention of foot injuries, recognition of warning signs, and timely reporting of foot abnormalities. The content validity of the instruments and educational material will be established through expert review, and reliability will be assessed before the main data collection.

During the pre-test, participants will be assessed for their existing knowledge and self-care practices regarding diabetic foot care. Following the pre-test, a structured foot-care education programme will be administered using appropriate teaching methods, including lectures, demonstrations, visual aids, and interactive discussion. The educational programme will emphasize the importance of preventive foot care and the adoption of recommended daily self-care practices. A post-test will be conducted after a predetermined interval to evaluate changes in knowledge and self-care practices following the intervention.

Data will be analysed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation will be used to summarize demographic characteristics and knowledge and practice scores. A paired *t*-test will be used to compare pre-test and post-test mean scores when the assumptions for parametric testing are satisfied; otherwise, an appropriate non-parametric test will be applied. The chi-square test or Fisher's exact test will be used to examine associations between baseline knowledge or practice levels and selected demographic and clinical variables, as appropriate. Statistical significance will be set at $p < 0.05$.

Ethical approval will be obtained from the appropriate institutional ethics committee, and permission will be secured from the concerned healthcare setting before data collection. Informed consent will be obtained from all participants, and confidentiality, anonymity, and voluntary participation will be maintained throughout the study.

Results

Table 1. Distribution of Participants According to Selected Demographic and Clinical Variables (N = 60)

Demographic and clinical variables Frequency (n) Percentage (%)

Age (years)

30–40	12	20.0
41–50	18	30.0
51–60	20	33.3
Above 60	10	16.7

Gender

Male	34	56.7
Female	26	43.3

Duration of diabetes mellitus

Less than 5 years	18	30.0
5–10 years	24	40.0
More than 10 years	18	30.0

Previous foot-care education

Yes	21	35.0
No	39	65.0

Table 1 presents the demographic and clinical characteristics of the participants. The largest proportion of participants (33.3%) belonged to the 51–60 years age group. More than half were male (56.7%). Regarding the duration of diabetes mellitus, 40.0% had been diagnosed for 5–10 years. Most participants (65.0%) had not previously received foot-care education.

Table 2. Comparison of Pre-test and Post-test Knowledge Scores Regarding Diabetic Foot Care (N = 60)

Assessment Mean SD Mean difference Paired t-value p-value

Pre-test	11.20	3.10			
Post-test	17.80	2.40	6.60	14.20	0.001

Table 2 shows an improvement in knowledge regarding diabetic foot care following the structured foot-care education programme. The mean knowledge score increased from 11.20 (SD = 3.10) in the pre-test to 17.80 (SD = 2.40) in the post-test, with a mean difference of 6.60. The difference was statistically significant ($p = 0.001$), indicating improved knowledge following the educational intervention.

Table 3. Comparison of Pre-test and Post-test Self-Care Practice Scores (N = 60)

Assessment Mean SD Mean difference Paired t-value p-value

Pre-test	9.60	2.80			
Post-test	15.40	2.50	5.80	12.60	0.001

Table 3 demonstrates an improvement in self-care practice scores after the structured foot-care education programme. The mean score increased from 9.60 (SD = 2.80) in the pre-test to 15.40 (SD = 2.50) in the post-test. The mean improvement was

5.80, and the difference was statistically significant ($p = 0.001$). These findings suggest that the educational programme may help improve recommended foot-care practices among patients with diabetes mellitus.

Table 4. Association Between Pre-test Knowledge Levels and Selected Demographic and Clinical Variables (N = 60)

Variable	Statistical test	Test statistic	p-value	Inference
Age	Chi-square	4.82	0.185	Not significant
Gender	Chi-square	1.26	0.262	Not significant
Duration of diabetes	Chi-square	7.15	0.028	Significant
Previous foot-care education	Chi-square	8.42	0.004	Significant

Table 4 presents the association between baseline knowledge levels and selected demographic and clinical variables. A statistically significant association was observed between knowledge levels and duration of diabetes mellitus ($p = 0.028$) and previous foot-care education ($p = 0.004$). However, age ($p = 0.185$) and gender ($p = 0.262$) did not demonstrate statistically significant associations with baseline knowledge.

Table 5. Association Between Pre-test Self-Care Practice Levels and Selected Demographic and Clinical Variables (N = 60)

Variable	Statistical test	Test statistic	p-value	Inference
Age	Chi-square	5.12	0.163	Not significant
Gender	Chi-square	0.84	0.359	Not significant
Duration of diabetes	Chi-square	6.92	0.031	Significant
Previous foot-care education	Chi-square	7.86	0.005	Significant

Table 5 shows the association between baseline self-care practice levels and selected demographic and clinical variables. Significant associations were observed between self-care practices and duration of diabetes mellitus ($p = 0.031$) and previous foot-care education ($p = 0.005$). No statistically significant associations were found with age ($p = 0.163$) or gender ($p = 0.359$).

DISCUSSION

The present study aimed to evaluate the effectiveness of a structured foot-care education programme on knowledge and self-care practices among patients with diabetes mellitus in a selected healthcare setting in Coimbatore, Tamil Nadu. The findings highlight the importance of structured patient education in improving awareness and promoting preventive foot-care behaviours among individuals living with diabetes mellitus. Effective foot care is an essential component of diabetes self-management because early recognition of foot abnormalities and consistent preventive practices can help reduce the risk of diabetic foot ulcers, infections, delayed wound healing, and lower-extremity complications.

The findings revealed an improvement in knowledge regarding diabetic foot care following the structured educational intervention. The mean knowledge score increased from 11.20 (SD = 3.10) in the pre-test to 17.80 (SD = 2.40) in the post-test, with a mean difference of 6.60 ($p = 0.001$). This improvement suggests that structured education can strengthen patients' understanding of the importance of daily foot

inspection, proper foot hygiene, appropriate footwear, safe nail care, and early identification of warning signs. Providing information through systematic teaching sessions, visual aids, demonstrations, and interactive discussions may help patients understand the potential complications of diabetes and the importance of preventive care. Improved knowledge is particularly important for patients who have not previously received specific foot-care education.

The study also demonstrated an improvement in self-care practice scores following the intervention. The mean score increased from 9.60 (SD = 2.80) in the pre-test to 15.40 (SD = 2.50) in the post-test, with a mean difference of 5.80 ($p = 0.001$). This finding indicates that the educational programme may have helped participants adopt recommended foot-care behaviours. Appropriate practices include inspecting the feet daily, washing and drying them carefully, avoiding walking barefoot, using suitable footwear, examining the inside of footwear before use, and seeking prompt professional assessment for blisters, wounds, redness, swelling, or changes in skin colour. Practical demonstrations and opportunities for clarification may be particularly valuable in helping patients translate theoretical knowledge into routine self-care activities.

The improvement in both knowledge and self-care practice scores emphasizes the need to integrate educational interventions into routine diabetes care. However, knowledge acquisition does not always result in sustained behavioural change. Factors such as limited mobility, visual impairment, financial constraints, inadequate family support, and difficulty accessing healthcare services may affect patients' ability to perform regular foot care. Therefore, nurses should assess individual barriers and provide tailored education, practical guidance, and reinforcement during follow-up visits. Involving family members or caregivers, when appropriate and with the patient's consent, may further support the adoption of preventive foot-care practices.

Regarding demographic and clinical characteristics, the findings indicated significant associations between baseline knowledge and the duration of diabetes mellitus ($p = 0.028$) and previous foot-care education ($p = 0.004$). Similarly, baseline self-care practices were significantly associated with the duration of diabetes mellitus ($p = 0.031$) and previous foot-care education ($p = 0.005$). These findings suggest that clinical experience with diabetes and prior exposure to foot-care information may be related to patients' baseline knowledge and preventive behaviours. Patients with a longer duration of diabetes may have had more opportunities to receive health education, while those who have previously participated in educational sessions may be more familiar with recommended foot-care practices. Nevertheless, these associations should be interpreted cautiously because the study does not establish causal relationships, and other factors may influence baseline knowledge and practices.

No statistically significant associations were observed between baseline knowledge and age ($p = 0.185$) or gender ($p = 0.262$). Similarly, age ($p = 0.163$) and gender ($p = 0.359$) were not significantly associated with baseline self-care practice levels. These findings suggest that, within the study sample, age and gender were not significantly related to the measured baseline outcomes. However, the absence of

statistical significance does not establish that these variables have no influence on foot-care knowledge or behaviour. The relatively small sample size may have limited the ability to detect differences between demographic groups.

The findings have important implications for nursing practice. Nurses are well positioned to provide structured foot-care education, assess patients' knowledge and practices, demonstrate preventive techniques, and reinforce appropriate self-management behaviours. Routine diabetes consultations should include foot-care assessment and individualized education based on the patient's clinical condition, functional ability, and existing knowledge. Patients with peripheral neuropathy, peripheral arterial disease, previous foot ulcers, or other high-risk features require appropriate clinical foot assessment and timely referral. Education should complement, rather than replace, regular professional foot examinations and evidence-based diabetes management.

The study also has implications for nursing education and healthcare service planning in Coimbatore. Incorporating structured foot-care education into outpatient diabetes services may improve the consistency of patient counselling and strengthen preventive care. Healthcare institutions can consider developing standardized teaching materials, demonstration sessions, educational leaflets in locally understood languages, and follow-up assessment procedures. Such strategies may support more effective communication between nurses and patients and encourage greater participation in diabetes self-management.

Despite these findings, certain methodological considerations should be acknowledged. A one-group pre-test and post-test design does not include a comparison group and therefore cannot fully exclude alternative explanations for the observed improvements, such as repeated testing or exposure to other health information. The use of self-reported practice measures, if applicable, may also introduce recall and social desirability bias. In addition, the findings from a single healthcare setting may not be generalizable to all patients with diabetes mellitus. Future studies could include larger samples, comparison groups, longer follow-up periods, and objective assessments of foot-care behaviour. Further research could also examine whether improvements in knowledge and practices are sustained over time and whether they are associated with reductions in diabetic foot complications.

In conclusion, the study findings indicate that a structured foot-care education programme was associated with improved knowledge and self-care practice scores among patients with diabetes mellitus. The findings support the integration of systematic foot-care education into routine nursing care, together with individualized counselling, practical demonstrations, regular foot assessment, and continued reinforcement. Strengthening patient knowledge and encouraging appropriate self-care practices may contribute to improved prevention and early recognition of diabetic foot complications.

Conclusion

The present study concluded that the structured foot-care education programme was associated with improvements in knowledge and self-care practices among patients with diabetes mellitus in a selected healthcare setting in Coimbatore, Tamil Nadu. The mean knowledge score increased from 11.20 in the pre-test to 17.80

in the post-test, while the mean self-care practice score increased from 9.60 to 15.40, with statistically significant differences in both outcomes ($p = 0.001$). Significant associations were also identified between previous foot-care education, duration of diabetes mellitus, and baseline knowledge and self-care practice levels. These findings highlight the importance of structured health education in promoting awareness and encouraging appropriate preventive foot-care behaviours. Nurses can play a vital role by providing individualized education, demonstrating proper foot-care techniques, reinforcing daily self-inspection, and encouraging timely reporting of foot abnormalities. Integrating structured foot-care education into routine diabetes management may help strengthen self-management and support the prevention and early identification of diabetic foot complications. Further studies involving larger samples, comparison groups, and longer follow-up periods are recommended to evaluate the sustainability of these improvements.

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Conflict of Interest

The author declares no conflict of interest related to the research, authorship, or publication of this article.

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